After a disappointing start, the Top 100 dp vendors roared back to set new records for revenues.

by William Cappelli

As the economy picked up momentum last year, data-processing vendors—leaders among high-technology businesses—went on a roll. Growth, in terms of revenue, was impressive—phenomenal for some corporations. Suppliers of computer hardware, software, and services were ready to cash in on the increased demand for capital goods and processing power spurred by the robust economy.

The major developments of 1983 included the resurgence of the original-equipment manufacturers (OEMs), fueled by a surging demand for data storage, and the start of a shakeout of personal-computer manufacturers. Several crucial strategic errors by microsystem vendors and the powerful lure of IBM standardization contributed to an upheaval in the personal-computer segment. IBM emerged with the lion's share of the market. Indeed, for the first time, IBM's revenues from personal-computer sales surpassed those of Apple Computer.

Led by IBM, the 100 largest vendors in dp recorded aggregate revenues of almost $91.06 billion (Table 1). The aggregate total represents a nominal increase of 16 percent over the $78.1 billion aggregate recorded by the 1982 edition of the Top 100 (the two rosters are not identical). The gains made by dp's Century Club are even more impressive in light of the disappointing first-half results many reported. Most suppliers registered gains in 1983 only during the last two quarters.

This year's 100 top dp vendors registered a 16.7 percent nominal increase over their 1982 aggregate results of about $78 billion. Adjusting these results for inflation (using the

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This is the fifth edition of Gartner Group's list and analysis of the Top 100 data-processing vendors—the third one that has appeared exclusively in Computer Decisions. *Copyright 1984 by the Gartner Group, Stamford, CT.*

Photo by Bill Oliva

federal government's formula), the Top 100 of 1983 grew by 13 percent in real terms. In comparison, the gross national product grew a mere 3.4 percent in real terms during the same period.

The narrowing of real- and nominal-growth rates evident in the 1982 results continued last year. The 1982 edition of the Top 100 registered a 16.8 percent real-growth rate and a 20 percent nominal rate, compared to this year's 13 percent real rate and 16.7 percent nominal rate. These figures suggest that although the dp industry has continued to expand at a healthier rate than other segments of the economy, it is becoming more closely integrated with the rest of the economy and more sensitive to business cycles. However, if the Top 100 is more vulnerable than before to recession, it won't feel the pinch for at least the next year, as the economy continues to boom.

The cutoff point—in revenues—for admission to the Top 100 leapt an incredible 31 percent for the 1983 list. The last vendor on the list in 1982, American Management Systems, recorded revenues of $70 million. That vendor isn't even on this year's list, and Cipher Data Products, which checked in at No. 100, registered $92 million in revenues.

As might be expected, several corporations were unable to keep up with this breakneck pace. Nine companies fell from the Top 100 during the course of 1983, up from three during 1982. Sundata, ModComp, McGraw-Hill's DRI subsidiary, Comshare, Systems Industries, Bradford National, Lear-Siegler, Anacomp, and Triad failed to generate enough dp business for inclusion on this year's roster. No companies were lost to acquisition—a somewhat surprising development in a merger-mad year—but this situation will change in 1984. Lanier and Harris completed a merger in late October (so they are listed separately in this report), while McDonnell Douglas is acquiring Tymshare.

Newcomers to the ranks of the Top 100 include Compaq, a Houston-based manufacturer of IBM PC-compatible portables. It was cata-

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Table 1

The Top 100

U.S.-based vendors, ranked by 1983 dp revenues (Dollars in millions)

Rank '83	Rank '82	Rank '81			Dp revenues '83	Dp revenues '82	Dp revenues '81	Growth '83/'82
1	1	1		IBM	$37,367	$31,467	$25,111	18.7%
2	2	2		DEC	4,826	4,019	3,586	20.1
3	3	6		Burroughs	4,038	3,809	2,478	6.0
4	4	3		Control Data	3,507	3,301	3,120	6.3
5	5	5		NCR	3,040	2,838	2,714	7.1
6	6	4		Sperry	2,799	2,802	2,775	-.1
7	7	7		Hewlett-Packard	2,518	2,268	1,875	11.0
8	9	9		Wang Labs.	1,792	1,321	1,008	35.6
9	8	8		Honeywell	1,666	1,685	1,774	-1.1
10	10	11		Xerox	1,222	1,050	872	16.4
11	19	22	⇑	Apple Computer	1,084	663	400	63.4
12	13	12		TRW	1,015	825	855	23.0
13	26	45	⇑	Commodore Int'l.	969	420	176	130.8
14	16	19	⇑	Tandy (Radio Shack)	945	725	460	30.4
15	14	13		Data General	867	803	764	7.9
16	11	10		Storage Technology	860	1,030	890	-16.5
17	17	17		Automatic Data Processing	816	712	624	14.6
18	12	14		General Electric	800	850	735	-5.9
19	24	21		Amdahl	777	462	442	68.3
20	15	15		Texas Instruments	739	746	640	-1.0
21	18	16		Computer Sciences	718	683	624	5.2
22	20	18		Electronic Data Systems	694	555	480	25.0
23	30	25		Management Assistance	559	354	349	57.9
24	21	20		Datapoint	554	513	452	7.9
25	23	26		McDonnell Douglas	542	474	346	14.4
26	25	24		Prime Computer	516	435	364	18.5
27	22	44		Motorola	514	484	180	6.0
28	27	27		National Semiconductor	486	387	320	25.7
29	33	36	⇑	Tandem Computers	450	330	242	36.1
30	28	23		Teletype	437	377	368	15.8
31	36	33		Computervision	400	325	270	23.0
32	40	37		Racal-Milgo	387	300	240	29.0
33	29	28		Mohawk Data Sciences	384	355	314	8.1
34	35	42	⇑	C.Itoh	360	326	213	10.4
35	38	31		Dataproducts	352	318	289	10.5
36	54	84	⇑	Tandon	343	177	70	94.2
37	32	30		Tektronix	338	336	309	.7
38	37	32		Gould	334	325	280	2.8
39	45	41		3M	330	223	220	48.0
40	34	27		Triumph-Adler	330	327	320	.9
41	31	29		Harris	327	344	313	-5.0
42	32	34		Raytheon	302	336	260	-10.1
43	41	38		Tymshare	288	297	235	-2.8
44	39	67		Warner Communications	281	310	115	-9.4
45	43	43		Boeing	275	264	206	4.2
46	42	35		ITT	265	265	250	0
47	61	74	⇑	Intergraph	252	155	91	61.9
48	48	54		Philips Information Systems	250	203	140	23.2
49	51	47		Lanier Business Products	223	194	161	14.8
50	105	n/m		Seagate	222	56	n/m	289.9

⇑ = Vendor moved up in ranking two consecutive years.
n/m = not meaningful n/a = not available n/c = not calculable
** Summary figures for 1982 and 1981 exclude revenues listed as n/a or n/m.*
Alphabetical index to corporations in the Top 100 is on page G42.

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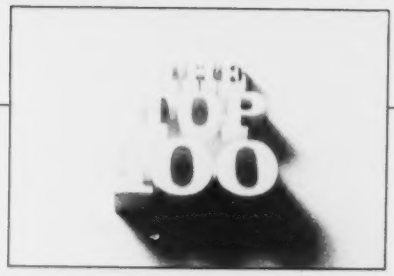

Rank '83	Rank '82	Rank '81			Dp revenues '83	Dp revenues '82	Dp revenues '81	Growth '83/'82
51	65	56		United Telecommunications	222	148	137	50.0
52	50	55		Telex	221	194	142	13.8
53	44	40		Northern Telecom	220	237	222	-7.2
54	46	39		Perkin-Elmer	213	207	226	3.2
55	57	59	⇑	Shared Medical Systems	210	165	131	27.2
56	47	57		Paradyne	210	207	135	1.3
57	53	46		Sanders	207	181	166	14.3
58	60	n/m		NEC Information Systems	200	160	n/a	25.0
59	52	49		Nixdorf Computers	200	186	159	7.5
60	56	50		Informatics General	197	170	150	16.3
61	58	68		M/A Com	196	164	112	19.2
62	49	48		Allied	195	195	160	0
63	60	61		CPT	192	158	123	21.1
64	63	58		General Instrument	191	152	135	26.1
65	59	52		Signal Companies	180	163	147	10.4
66	71	86	⇑	Dysan	178	138	63	28.4
67	70	65		Centronics Data	170	139	116	21.6
68	67	70		Cray Research	169	141	101	20.2
69	85	98	⇑	Televideo Systems	168	98	34	71.2
70	55	51		Schlumberger	167	175	148	-4.5
71	86	100	⇑	Convergent Technologies	163	96	13	69.5
72	69	63		Grumman	157	140	119	12.1
73	74	75	⇑	Quotron	153	120	88	27.2
74	68	53		Wyly	152	140	146	8.9
75	78	71		Dun & Bradstreet	150	110	100	36.4
76	73	72		Martin Marietta	149	122	98	22.5
77	80	78		First Data Resources	148	106	81	40.2
78	88	85		Verbatim	147	91	68	60.3
79	75	66		Reynolds & Reynolds	147	119	115	22.9
80	83	82		Management Science America	145	101	73	43.4
81	66	64		Planning Research	143	146	117	-2.3
82	76	97		NBI	140	119	43	17.5
83	79	69		Gerber Scientific	135	107	101	26.4
84	106	n/m		Continental Telecomm	130	52	n/m	150.0
85	82	83		National Data	128	103	71	24.3
86	84	n/m		Zenith	125	100	n/a	25.0
87	72	89		Exxon	120	130	60	-7.7
88	77	60		Recognition Equipment	117	112	131	4.1
89	n/m	n/m		L.M. Ericsson	115	n/a	n/a	n/c
90	n/m	n/m		Compaq	111	n/m	n/m	n/c
91	81	73		Commerce Clearing House	109	104	91	4.5
92	102	98		Cullinet Software	108	69	36	55.5
93	93	78		Interactive Data	105	82	81	28.0
94	98	95		Decision Data	103	74	50	39.7
95	94	88		Computer Consoles	103	79	60	30.9
96	95	89		Printronix	101	77	60	31.6
97	92	90		Floating Point Systems	100	86	57	15.7
98	103	93		General Datacomm Inds.	98	68	54	43.7
99	97	96		Nashua	97	74	50	30.6
100	101	99		Cipher Data Products	92	70	33	32.4
				Summary	$91,057	$77,999*	$63,923*	

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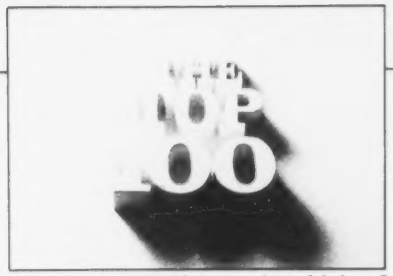

pulted from virtually nowhere in 1982 to rank 90th. L. M. Ericsson, the Swedish giant that made its presence felt as an OEM in the United States for the first time, is also a notable newcomer. By acquiring Cado and STSC, telecommunications conglomerate Continental Telecomm (Contel) thrust itself into the thick of dp's top performers. General Datacomm, manufacturer of an array of data-communications products, and Cullinet Software, the software house that just missed inclusion on the 1982 list, also moved into the Top 100 this time around.

Leaving aside the extraordinary cases of Compaq and L.M. Ericsson, three corporations—Seagate, Contel, and Commodore—more than doubled their business between 1982 and 1983. That's half the number of revenue-doublers on the 1982 list. Interestingly, three of the Top 100 members boasting doubled revenues in 1982 came from the bottom half of the list, while only one of 1983's members—Contel—did. However, Contel's extraordinary dp growth is attributable solely to acquisitions. Compaq doesn't appear on this year's revenue-growth chart because it recorded no positive revenues in 1982. Of course, one may argue that Compaq's success will prove to be ephem-

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Table 2

Comparing IBM to the Top 100

(Dollars in millions)

	1983 dp revenues	'83/'82 growth rate	1982 dp revenues	'82/'81 growth rate
IBM	$37,367	18.7%	$31,467	25.3%
No. 2 - No. 10	25,408	10.0	23,093	14.2
Top 10	62,775	15.0	54,560	20.4
No. 11 - No. 100	28,282	20.6	23,439	23.7
No. 2 - No. 100	53,690	15.3	46,532	18.8
Top 100	91,057	16.7	77,999	21.4

Table 3

The fast trackers

Top 20 in total dp-revenue-growth rate (Dollars in thousands)

	'83/'82 growth	Dp revenues 1983	Dp revenues 1982	'83/'82 growth rate U.S.	'83/'82 growth rate Foreign
Seagate	289.9%	$222,020	$56,940	354.7%	60.8%
Continental Telecomm	150.0	130,000	52,000	150.0	0
Commodore Int'l.	130.8	969,339	420,000	257.7	46.2
Tandon	94.2	343,885	177,053	103.0	20.6
Televideo Systems	71.2	168,718	98,530	69.0	78.7
Convergent Technologies	69.5	163,500	96,462	91.6	20.3
Amdahl	68.3	777,700	462,200	54.5	100.3
Apple Computer	63.4	1,084,705	663,800	75.6	31.4
Intergraph	61.9	252,000	155,642	72.4	40.9
Verbatim	60.3	147,378	91,933	81.0	−1.3
Management Assistance	57.9	559,212	354,174	23.4	100.0
Cullinet Software	55.5	108,358	69,691	59.4	36.2
United Telecommunications	50.0	222,000	148,000	52.9	28.2
3M	48.0	330,050	223,000	48.5	46.8
General Datacomm Inds.	43.7	98,492	68,517	55.8	21.7
Management Science America	43.4	145,176	101,224	48.4	27.2
First Data Resources	40.2	148,600	106,000	40.2	40.0
Decision Data	39.7	103,829	74,319	38.6	44.4
Dun & Bradstreet	36.4	150,000	110,000	0	36.4
Tandem Computers	36.1	450,516	330,949	38.6	30.4

Compaq is not listed as a "fast tracker" because a growth rate is not calculable. See Table 6 for Compaq's growth in absolute dollars.

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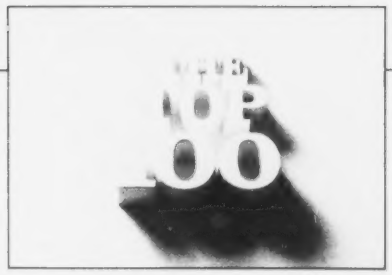


eral as IBM revs up its own portable, the Portable Personal Computer. Compaq is alone among PC-compatible vendors on the Top 100 list.

IBM increased its dp revenues by 18.7 percent in 1983, down from its 25.3 percent increase the previous year. On the other hand, the premier dp corporation captured more of the total dp-revenue pie in 1983 than it had in 1982—41 percent, up from 40.3 percent. (See Table 2.) For the second year in a row, IBM increased its market share, a trend that is likely to continue. The days when Big Blue would tolerate a slow but certain erosion of its market share appear to be over. About 93 percent of IBM's revenues now come from dp, up from 90 percent in 1982 and 87 percent the year before that. The other 99 vendors still managed a highly respectable 15.3 percent year-to-year gain.

In 1983, the Top 10 corporations accounted for 68.9 percent of the Top 100's total revenue from dp. That was down slightly from the 69.9 percent they garnered in 1982. Unlike IBM, the Top 10 as a unit has accounted for an ever smaller portion of the revenue pie each year for the last five years. The Top 10 continues to grow at a slower pace than the Top 100 as a whole—its rate was 20.4 percent in 1982 and 15 percent last year.

Membership in the Top 10 has remained stable for two years, except for Wang's leapfrog over Honeywell into the eighth rank. Honeywell dropped one notch to the ninth position. Five members of the Top 10 are primarily vendors of mainframes: IBM, Burroughs, NCR, Sperry, and Honeywell. Three—Digital Equipment Corp. (DEC), Hewlett-Packard, and Wang—derived the bulk of their dp revenues from minicomputers. The two remaining firms, Control Data and Xerox, achieved their exalted status primarily as OEMs. (Xerox' revenues from its Diablo Systems and Shugart operations exceed its revenues from its own office systems.) Of course, it could be argued that IBM is in a class by itself, deriving whopping revenues from sales of mainframes, as well as minis and microcomputers.

Industry-wide expansion during 1983 pushed more Top 100 corporations over the $200 million plateau. Fifty-nine attained at least $200 million in revenues last year, up from 48 in 1982. In addition, all but three of 1983's Top 100 achieved more than $100 million in dp revenues. Apple and TRW joined the billion-dollar club in 1983, bringing the number of Top 100 companies with dp revenues of over $1 billion to 12, up from 11 in 1982. Storage Technology, after a horrendous year, fell from this exclusive club.

"The Top 100's gains are even more impressive in light of the disappointing first-half results many reported."

Table 4

The Bottom 20 *in revenue-growth rate*

	'83/'82 dp growth rate			
	Total	U.S.	Foreign	'83 rank
Storage Technology	−16.5%	−16.5%	−16.5%	16
Raytheon	−10.1	5.4	−56.5	42
Warner Communications	−9.4	−9.2	−10.0	44
Exxon	−7.7	−7.7	0	87
Northern Telecom	−7.2	0	−7.2	53
General Electric	−5.9	−4.2	−10.0	18
Harris	−5.0	−4.8	−6.2	41
Schlumberger	−4.5	−1.4	−16.9	70
Tymshare	−2.8	0	−2.8	43
Planning Research	−2.3	−2.2	−6.5	81
Honeywell	−1.1	.9	−6.6	9
Texas Instruments	−1.0	−10.8	47.6	20
Sperry	−.1	3.1	−4.6	6
Allied	0	0	0	62
ITT	0	0	0	46
Tektronix	.7	.3	1.0	37
Triumph-Adler	.9	2.3	−.7	40
Paradyne	1.3	1.3	1.4	56
Gould	2.8	2.8	2.8	38
Perkin-Elmer	3.2	−1.4	11.7	54

The movers and the shaken

Which dp stars were the prime movers last year? Aside from Compaq and Ericsson (neither of which appeared the 1982 list), OEMs captured the lion's share of spots on the list of companies with the 20 best rates of revenue growth (Table 3). Four OEM corporations, up from two the previous year, occupy spots on the Top 20 list in revenue-growth rate. They are: Seagate, Tandon, Televideo, and Convergent Technologies. Personal-computer vendors captured only two places on this list, down from six in 1982. This is probably evidence of the consolidation underway in the micro industry.

In terms of big moves up the Top 100 roster, for the second year in a row, Tandon led the pack, jumping 18 places to No. 36. Televideo, Con-

vergent Technologies, United Telecomm, Intergraph, and Commodore International also performed well, leaping upward 16, 15, 14, 14, and 13 places, respectively. None of these gains matches the phenomenal growth of some of 1982's high-flyers, but they were impressive in a year of relative stability. Most of the Top 100 vendors hovered near their places on the 1982 list, or remained unchanged. Apple, which moved up eight places, also deserves to be singled out. Indeed, Apple and Commodore made advances near the top of the list, where a single upward step may represent more than $50 million in revenue.

On the other hand, 13 companies actually saw their dp revenues decline during 1983, up from six in 1982. The corporations known as "the Bunch" (Burroughs; Univac, now known as Sperry; NCR; Control Data; and Honeywell) fared slightly better in 1983 than they did in 1982, when all but Burroughs appeared on the listing of the 20 poorest performers (see Table 4). This year, Honeywell and Sperry are the only Bunch members included on the Bottom 20 list, and Honeywell registered fine operating profits. The Bunch companies continue to lose share of the Top 100 revenue pie to IBM, however. Their slice of the total was trimmed to 16.5 percent last year from 18.5 percent in 1982.

"For the first time, IBM's revenues from personal-computer sales surpassed those of Apple Computer."

Other low-fliers were Texas Instruments, which pulled out of the home-computer business after suffering huge losses, and Warner Communications, which continues to lose on its home-computer line. Sperry, Honeywell, ITT, and Triumph-Adler made the Bottom 20 for the fourth straight year. Storage Technology caps this list of unfortunates, having lost revenues at the rate of 16.5 percent. Warner's 9.4 percent loss is particularly tragic, considering that two years ago this vendor's dp operations exploded at the rate of 475 percent.

Big Blue thunders

In terms of dp revenues gained (Table 6), IBM again increased its treasure trove by a sum greater than all of No. 2 DEC's revenues. IBM is accustomed to pulling off this amazing feat—it has for five years running. Last year, IBM's revenue gain surpassed the total gain of the remaining Top 100 members. This year, however, IBM's $5.9 billion missed that achievement by about $800 million.

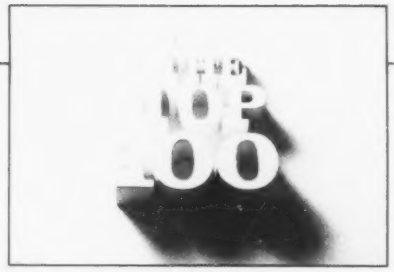
IBM announced several major products last year. The 4381 provided an air-cooled upgrade for 4341 users who previously had no alternative but to make the expensive move to water-cooled systems. The most significant announcements were the XT/370 and the 3270 PC, two personal computers

Table 5

Market-segment analysis *of the Top 100 vendors in the dp industry*

(Revenue dollars in millions)

	1983 dp revenues	1982 dp revenues	Change '83/'82
Mainframes (over $250,000)	$21,990	$19,643	11.9%
Minicomputers ($15,000-$250,000)	12,034	10,633	13.2
Microcomputers (under $15,000)	6,055	3,026	100.1
Word processing	3,072	2,472	24.3
Total Top 100 systems revenues	$43,151	$35,774	20.6%
Computer-aided design/manufacturing	$1,559	$1,299	20.0%
OEM peripherals	6,351	5,285	20.2
End-user peripherals	8,621	8,660	–.5
Data-communications hardware	2,700	2,051	31.6
Software	5,586	4,658	19.9
Services	8,482	7,735	9.7
Media	1,094	641	70.7
Maintenance	12,700	11,493	10.5
Other dp revenues	813	403	101.7
Total Top 100 support revenues	$47,906	$42,225	13.5%
Total Top 100 dp revenues	$91,057	$77,999	16.7%



designed for integration with IBM mainframe systems. These two products won't generate big-volume sales for Big Blue, but they are important because they expand the IBM Personal Computer line. Ultimately, the PC will become the base product of IBM's low-end line. Soon, IBM is expected to announce a token-passing local-area network that will wrap the entire IBM line of products for the office into interactive systems.

Mainframe sales on top

Following a long-standing trend, mainframe suppliers dominated the Top 100 in revenues broken down by product type (Table 5). After a surprising surge in 1982, however, growth in mainframe revenues returned to its historic rate of about 12 percent. Sales of minis, while growing faster than sales of mainframes, advanced at a slower rate last year than in 1982. An anticipated upswing in the minicomputer market materialized, but too late to have an effect on the yearlong-performance figures.

Excluding the catchall category of "other dp revenues," the sale of microcomputers registered the fastest growth. Led by IBM and Commodore, micro sales accelerated at a rate of 100.1 percent, more than 15 percent faster than 1982's rapid growth rate. This rate of increase is particularly remarkable in light of the hemorrhage-like losses at Warner and Texas Instruments. Sales of OEM peripherals, buoyed by rosy economic conditions, grew 20.2 percent. Media, a new category in the market-segment breakdown this year, experienced tremendous growth, at 70.7 percent, a reflection of dp vendors' expectations for solid demand during the coming months.

Systems revenues, including those generated by the sale or lease of mainframes, minis, micros, and word processors, came to $43.15 billion in 1983, up 20.6 percent from the $35.77 billion grossed the previous year. Sales of systems accounted for 47.4 percent of total dp revenues. Interestingly, the annual growth rate of systems sales has remained steady in nominal terms for the past five years, never deviating more than a point from 20 percent. The growth rate of support-products revenues has been far more cyclical in recent years.

"Hardware manufacturers are finding themselves forced to rely on the clever designs of software creators."

All this good news was somewhat counterbalanced by the first *decline* in any product category in the short history of this study. End-user-peripheral sales dropped half a percent in 1983, dragged down primarily by Storage Technology.

IBM: Master of profitability

IBM continues to reap the vast bulk of the profit harvest in dp. Big Blue earned an estimated $8.19 billion in operating income from dp sales in 1983, up 13 percent from the estimated $7.25 billion earned during the previous year. Thus, IBM earned more than 69 percent of the profits garnered by the Top 100, an increase over last year's 63 percent share. IBM's profitability is even more impressive considering that its share of the total dp market stands at 41 percent.

On the other hand, IBM fell from second to fifth place on the list ranking corporations by their dp operating margins (Table 7). Big Blue lost

(Continued on page G27)

Table 6

Top 20 in dp-revenue gain

(Dollars in thousands)

	Gain '83	Gain '82	'83/'82 growth rate
IBM	$5,899,800	$6,356,600	18.7%
DEC	807,823	432,400	20.1
Commodore Int'l.	549,339	244,000	130.8
Wang Labs.	470,700	312,987	35.6
Apple Computer	420,905	263,085	63.4
Amdahl	315,500	19,400	68.3
Hewlett-Packard	250,000	393,000	11.0
Burroughs	229,000	1,331,500	6.0
Tandy (Radio Shack)	220,100	265,000	30.4
Control Data	206,800	180,700	6.3
Management Assistance	205,038	5,106	57.9
NCR	202,000	124,000	7.1
TRW	190,000	-30,000	23.0
Xerox	172,000	178,300	16.4
Tandon	166,832	106,636	94.2
Seagate	165,080	56,940	289.9
Electronic Data Systems	138,974	75,001	25.0
Tandem Computers	119,567	88,477	36.1
L.M. Ericsson	115,000	n/m	n/m
Compaq	111,000	n/m	n/m

n/m = not meaningful

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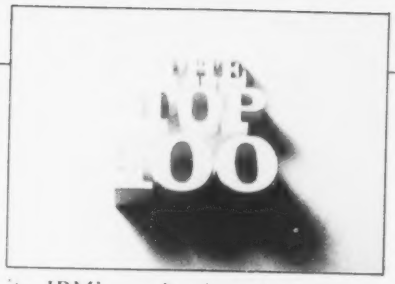

a little more than a percentage point—21.9 percent, down from 23 percent. This year's finish on the operating-profit-margin listing suggests that the trimmings spurred by the last recession had a salutary effect on other parts of the industry. Quotron, Cray, Shared Medical Systems, and Telex—traditionally strong contenders in this category—passed the Armonk, NY-based giant with operating margins of 27.9 percent, 25.6 percent, 24.4 percent, and 23.6 percent, respectively. The big personal-computer vendors are noticeably absent from the Top 20 performers on the dp-operating-margins ranking. Apple and Tandy Corp. (manufacturer of the Radio Shack line) made the 1982 list. But as competition intensified last year, the margins of most micro vendors shrank. Commodore, No. 12 on the latest ranking, is the only exception.

Because of a combination of high profitability and large absolute profits, IBM's results skew the industry-average figures, making data processing seem to be more profitable than it is for most of the industry's corporations. For the 82 Top 100 members that make up the basis for this statistic, the average operating margin was 9.3 percent. If weighted, the average profit margin becomes 13 percent, a clear indication of how IBM distorts the Top 100's profitability picture.

Recession's legacy

Overall dp employment, measured by 80 reporting members (representing 94 percent of the total revenues) of the Top 100 increased at the very modest rate of 4.6 percent. This rate of increase was significantly slower than the rate of revenue growth for the same corporations, making 1983 the fifth year of increase in dp-employee revenue productivity (Table 8). For the first time in three years, C. Itoh Electronics failed to retain first place in the rankings for dp revenue per dp employee, ceding the top spot to Zenith Data Systems. C. Itoh dropped to second place. Except for C. Itoh, the revenue-per-employee statistic was up across the board among the 10 top finishers in this category—a legacy of the last recession with its big layoffs. Although it did not make the top half of this ranking, IBM revved up its dp-employee productivity to its highest level in five years.

Except in a few isolated cases—the resurgent mainframe vendor Amdahl and perennially healthy Commodore—foreign dp revenues grew at a significantly slower pace in 1983 than in the previous year (Table 11). Many corporations suffered declines in for-

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Table 7

Top 20 by operating margin

(Dollars in thousands)

	Operating income		Operating margin		
	1983	1982	1983	1982	Change
Quotron	$42,881	$27,628	27.9%	22.8%	22.0%
Cray Research	43,398	32,251	25.6	22.8	11.9
Shared Medical Systems	51,424	41,024	24.4	24.7	−1.4
Telex	52,232	35,200	23.6	18.1	30.4
IBM	8,192,370	7,250,450	21.9	23.0	−4.8
Televideo Systems	36,752	25,482	21.8	25.9	−15.8
Intergraph	53,275	24,956	21.1	16.0	31.8
Cullinet Software	22,551	14,897	20.8	21.4	−2.6
Computervision	80,000	67,624	20.0	20.8	−3.8
Floating Point Systems	19,318	15,477	19.3	17.9	7.8
Nashua	18,100	9,400	18.5	12.6	47.4
Commodore Int'l.	173,510	74,000	17.9	17.6	1.6
Hewlett-Packard	430,000	370,000	17.1	16.3	4.7
Computer Consoles	17,610	9,952	17.0	12.6	35.2
Automatic Data Processing	127,000	111,000	15.6	15.6	−.2
Verbatim	22,466	14,946	15.2	16.3	−6.2
Convergent Technologies	24,688	18,207	15.1	18.9	−20.0
Seagate	33,484	10,510	15.1	18.5	−18.3
Schlumberger	24,800	25,000	14.8	14.3	3.9
National Data	18,808	n/a	14.7	n/a	n/m

n/a = not available n/m = not meaningful

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eign revenues. The reasons: the strength of the dollar overseas and the sorry state of most of the world's economies. With the dollar high, foreign currencies are down, encouraging the importation of foreign-manufactured dp products by this country. Imports of computers and computer-related products from the Far East exceeded exports for the first time last year, according to the federal government's 1984 Industrial Outlook report.

The Top 20 in terms of foreign revenues includes four corporations not found in the Top 20 overall: Management Assistance, Prime Computer, Tektronix, and Computervision. (Foreign-owned corporations like Ericsson and Nixdorf are represented in this analysis only by their United States operations.)

IBM's share of foreign dp revenues remained at its 1982 level of 49.3 percent, while the share of foreign dp revenues going to companies in the Bottom 50 continued its five-year history of contraction, sinking to a low of 2.4 percent in 1983. IBM's market share within the United States alone jumped to 36 percent last year, from 34 percent.

As product life cycles are shortened, leased equipment becomes a burden for a vendor that is also trying to sell products. During the past five years, companies have reduced the percentage of their revenues generated via leases. In doing so, they've left the lease market to corporations that specialize in rentals. Leases accounted for 17.6 percent of the Top 100's total dp revenues last year, down from 19.3 percent the previous year and 22 percent in 1981. Mainframe vendors, which historically lead the dp industry in lease revenues, show the steepest decline in this revenue category. Indeed, during the past four years, mainframe-lease revenues declined more sharply than those of the entire industry.

"Conglomerates with dp operations had a rough time in 1983; many had flat dp earnings and some lost money."

The most rapidly growing members of the Top 100 continue to rely on revenues generated by outright sales. Conversely, the slowest growing corporations derived the largest portion of their revenues from services and maintenance.

Order rates for mainframes increased in 1983, with the greatest strength in the second half of the year. This trend will probably continue this year. More orders translate into higher shipments and improved revenues, improving prospects for many old-line mainframe manufacturers. All is not well, however. These corporations are attempting to diversify by moving into other, high-growth markets. But as they do, they will find themselves facing high, profit-sapping start-up costs. Moreover, diversifying corporations are moving into an already crowded marketplace. IBM dominates almost all aspects of data processing and at least one competitor occupies each market niche. There's not much room for new competitor companies to move into.

The plug-compatible mainframe makers had a good year. Both Amdahl and National Semiconductor are in the process of achieving compatibility with IBM's Extended Architecture (XA) and should begin shipping their IBM equivalents in quantity this year. They will probably be back in trouble by next year, however, as IBM's product line continues to evolve.

Table 8

Revenue-per-employee ranking *(Dollars in thousands)*

		Revenue per employee	Total employees	Operating income per employee	'83 dp revenue
1	Zenith	$333.3	375	$22.9	$125,000
2	C. Itoh	316.1	1,140	n/a	360,300
3	NEC Information Systems	266.7	750	n/a	200,025
4	Apple Computer	236.7	4,582	20.5	1,084,705
5	Compaq	203.3	546	21.8	111,000
6	Nashua	195.4	500	36.2	97,700
7	Televideo Systems	194.6	867	42.4	168,718
8	Amdahl	194.4	4,000	n/a	777,700
9	Convergent Technologies	186.2	878	28.1	163,500
10	Motorola	182.3	2,820	−1.8	514,000
14	IBM	113.4	329,600	24.8	37,367,000

n/a = not available

As noted, the anticipated recovery of the minicomputer industry did not materialize until the last quarter of 1983. The mini manufacturers were severely pinched by IBM's aggressive price cutting and growing competition from micros. This year, however, many of these companies will benefit from cyclical growth as a result of increases in capital spending. They'll also benefit from the increasing use of minis to link and enhance personal computers.

IBM routs micro competitors

IBM solidified its position as the dominant personal-computer vendor in 1983. After several years of domination of this segment, Apple Computer took a back seat to Big Blue last year. DEC's attempt to ship what looked like a blockbuster personal computer foundered, and Warner Communications' Atari division made almost every blunder in the book on the way to gigantic losses. Only Commodore has emerged unscathed and poised for strong growth in its targeted home-computer market this year. The shakeout of micro makers will probably continue this year, with Apple emerging as the only dominant alternative to IBM and the manufacturers of PC-compatible machines, like Compaq. The Japanese presence in personal computers could significantly expand this year.

The home-computer boom is by no means about to end, and the potential revenues for enterprising vendors are huge. About 10 percent of American households have a personal computer. By the end of the decade, that figure may reach 80 percent. IBM has yet to demonstrate that it has clout in the home market, and neither Commodore, Apple, nor Tandy has the dominance IBM enjoys among business users. Moreover, the shakeout has severely cut the supply of personal computers for the home, and the situation isn't expected to stabilize until next year at the earliest. Results from this year should indicate which vendors among the Top 100 are capitalizing on the potential of the home-computer market.

Last year was a year of watching and waiting in the office-systems business. However, positive trends are apparent in the year's results. The big office-automation vendors have finally begun to respond to user demands for integrated applications and information access. IBM, in particular, took major steps toward the integration of its office hardware (witness the release of Document Interchange Architecture/Document Content Architecture), and competitors in this segment of the industry have accepted IBM's role as standard-setter for the office. These trends will continue next year.

This year has all the earmarks of being a big one for the Top 100: The economy is strong and major corporate customers have increased capital spending. Some industry segments will find this climate more fruitful than others. For example, vendors of computer-aided-design and -manufacturing (CAD/CAM) systems felt the effects of the last recession last year. CAD/CAM's growth rate declined to 20 percent from 25.3 percent in 1982. However, as corporate capital spending rises, CAD/CAM suppliers should return to their formerly high-flying growth rates—perhaps as high as 40 percent this year.

"Industry-wide expansion during 1983 pushed 59 Top 100 corporations over the plateau of $200 million in revenues."

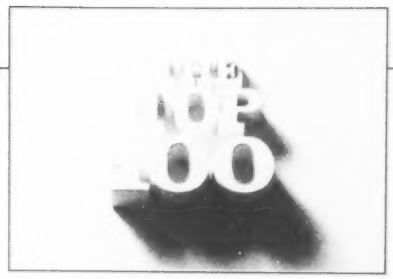
Peripherals and media should also continue to grow briskly in 1984, fueled by the growth of the personal-

Table 9

Top 20 by dp operating income

(Dollars in thousands)

	1983	1982	Change
IBM	$8,192,370	$7,250,450	13.0%
Hewlett-Packard	430,000	370,000	16.2
NCR	386,554	398,022	−2.9
Burroughs	361,500	248,100	45.7
DEC	338,100	668,078	−49.4
Sperry	278,300	233,700	19.1
Wang Labs.	251,300	185,000	35.8
Control Data	234,800	242,000	−3.0
Commodore Int'l.	173,510	74,000	134.5
Honeywell	130,800	79,800	63.9
Automatic Data Processing	127,000	111,000	14.4
Apple Computer	94,042	120,042	−21.7
Electronic Data Systems	87,646	73,975	18.5
Computervision	80,000	67,624	18.3
TRW	69,500	69,000	.7
Tandem Computers	55,012	40,991	34.2
Intergraph	53,275	24,956	113.5
Telex	52,232	35,200	48.4
Shared Medical Systems	51,424	41,024	25.4
Prime Computer	50,965	68,628	−25.7



computer segment. Supplies have begun to catch up to demand, however, creating far more treacherous conditions for vendors.

For both software and service vendors, the outlook for 1984 is universally bright. The key technology trends that have spurred the growth of these segments—declining hardware prices, a shortage of skilled programmers, and increasing end-user computing—should continue to accelerate. Combined with the strength of the economy, these factors will ensure solid performances from the software and services segments of the industry.

The fortunes of software vendors are being enhanced by the effects of the computer's penetration of the workplace and the home. As they learn more about computers, users are losing patience with the arcane ways of hardware "techies" who are concerned more with technical elegance and efficiency than with ease of use. Thus, hardware manufacturers are finding themselves forced to rely more and more on the clever designs of software creators for new, easier-to-use applications.

A specialist's game

Data processing is evolving into a specialist's game. The large conglomerates with dp operations had a bad time of it in 1983; many had flat dp earnings and some lost money (Table 12). After explosive growth in 1982, corporations whose dp operations account for less than 25 percent of their total revenues grew at the anemic rate of 4 percent. The poor track record of the conglomerates—combined with dp's potential sensitivity to trends in the economy—has halted the acquisition of dp subsidiaries by non-dp corporations. Some of these conglomerates have even begun to shed their dp operations.

Many telecommunications vendors are an exception to this rule, but they are special cases. Deregulation is having a profound effect on the structure of the dp and telecommunications industries. Technology is being allowed to follow its natural course toward a blurring of the border be-

(Continued on page G38)

"Big office-automation vendors have finally begun to respond to user demands for integrated applications."

Table 10

Top 20 in U.S. dp revenues

(Dollars in thousands)

		1983 U.S. revenues	Percent of total dp revenues	1982 U.S. revenues	Change '83/'82	Top 100 rank
1	IBM	$21,546,042	57.7%	$16,363,152	31.7%	1
2	DEC	3,040,898	63.0	2,411,400	26.1	2
3	Control Data	2,434,100	69.4	2,235,800	8.9	4
4	Burroughs	1,997,400	49.5	1,823,300	9.5	3
5	Sperry	1,686,500	60.2	1,635,900	3.1	6
6	NCR	1,640,000	53.9	1,410,000	16.3	5
7	Hewlett-Packard	1,510,000	60.0	1,170,720	29.0	7
8	Wang Labs	1,285,700	71.7	913,525	40.7	8
9	Honeywell	1,235,300	74.1	1,224,000	.9	9
10	Xerox	1,048,100	85.7	918,800	14.1	10
11	TRW	1,015,000	100.0	825,000	23.0	12
12	Apple Computer	843,704	77.8	480,396	75.6	11
13	Tandy (Radio Shack)	744,000	78.7	583,000	27.6	14
14	Automatic Data Processing	742,300	91.0	648,000	14.6	17
15	Electronic Data Systems	659,874	95.0	536,006	23.1	22
16	Storage Technology	639,000	74.3	765,000	−16.5	16
17	Computer Sciences	602,845	83.9	562,804	7.1	21
18	Commodore Int'l.	600,867	62.0	168,000	257.7	13
19	Data General	581,200	67.0	528,700	9.9	15
20	General Electric	575,000	71.9	600,000	−4.2	18
	Summary	$44,427,830		$35,803,503	24.1%	

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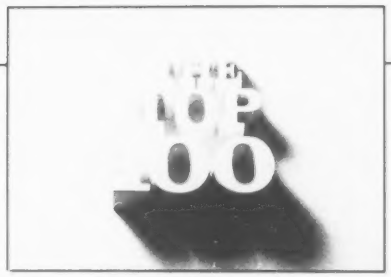


tween dp and communications. Companies that have grown up on one side of the border have been forced to diversify their product offerings, either through internal development (AT&T's approach), acquisitions (like Contel), or partnerships and other special relationships with other vendors (like the IBM and Rolm deal).

It is still too early to make predictions, but both industries are certainly changing. AT&T, in particular, stands at the crossroads. Saddled by a corporate culture shaped during decades of government regulation, the telecommunications giant has yet to prove its ability to prosper or survive the rigors of competition. So far, its actions have not demonstrated that AT&T has a firm grasp of the realities of the marketplace. However, there's no question that AT&T's financial might and reputation for quality are big pluses. If AT&T can rid itself of internal inertia, it may become a formidable competitor for IBM.

The Japanese penetration of the American market proceeds apace. For two years, the United States has had a trade deficit with Japan in the shipment of computers and related products. In 1983, the gap was so large it accounted for the United States' overall computer-trade deficit with the Far East. However, fears that the Japanese are grabbing the lead in advanced computer technology may be exaggerated. In particular, reports that Japanese researchers have equaled the performance of the Cray XMP supercomputer could turn out to be a red herring. In general, the Japanese probably won't be serious competitors in mainframes under their own names until the end of the decade. The Japanese vendors simply don't have the support and service networks necessary to sustain a drive to grab a big chunk of the American market.

The low end of the market is quite another matter. The Japanese corporations' ability to supply low-cost, high-quality products will soon propel "Japan Inc." into the forefront of the personal-computer and peripherals markets. Japanese vendors will be formidable competitors for Ameri-

"Except in isolated cases, foreign dp revenues grew at a much slower pace in 1983 than in the previous year."

Table 11

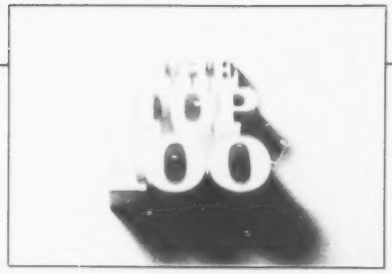
Top 20 in foreign dp revenues

(Dollars in thousands)

		1983 foreign revenues	Percent of total dp revenue	1982 foreign revenues	Change '83/'82	Top 100 rank
1	IBM	$15,821,358	42.3%	$15,104,448	4.7%	1
2	Burroughs	2,041,100	50.5	1,986,200	2.8	3
3	DEC	1,785,925	37.0	1,607,600	11.1	2
4	NCR	1,400,000	46.1	1,428,000	−2.0	5
5	Sperry	1,113,100	39.8	1,167,000	−4.6	6
6	Control Data	1,073,800	30.6	1,065,300	.8	4
7	Hewlett-Packard	1,008,000	40.0	1,097,280	−8.1	7
8	Wang Labs.	506,500	28.3	407,975	24.1	8
9	Honeywell	430,800	25.9	461,000	−6.6	9
10	Commodore Int'l.	368,472	38.0	252,000	46.2	13
11	Management Assistance	318,751	57.0	159,379	100.0	23
12	Data General	285,910	33.0	275,120	3.9	15
13	Amdahl	277,700	35.7	138,630	100.3	19
14	Apple Computer	241,001	22.2	183,404	31.4	11
15	General Electric	225,000	28.1	250,000	−10.0	18
16	Storage Technology	221,390	25.7	265,000	−16.5	16
17	Prime Computer	208,414	40.4	188,458	10.6	26
18	Tektronix	203,072	60.0	201,000	1.0	37
19	Tandy (Radio Shack)	201,100	21.3	142,000	41.6	14
20	Computervision	196,000	49.0	161,200	21.6	31
	Summary	$27,927,393		$26,540,994	5.2%	

can vendors weakened by the struggle with IBM.

IBM, of course, will continue to dominate the dp business for the foreseeable future. The overall distribution of revenues by company demonstrates that the computer market is an oligarchy, with the top few companies generating most of the revenues. Even with IBM removed, only a few companies control the majority of industry revenues. It's unlikely that this distribution of power and wealth will change. IBM calls the tune for the industry and all other vendors dance. The only exceptions are suppliers that established a presence in many sites early in the development of a particular industry



segment or those that have been successful in specialized markets.

In general, coexistence with IBM is a fact of life for the rest of the Top 100. That may mean no more than supporting IBM communications protocols or as much as offering plug-compatible products. Each strategy has its attendant rewards and risks, not the least of which is IBM's decision to exploit a market niche previously left to a smaller vendor. The dp industry is becoming littered with the corpses of small ambitious companies that took on IBM one-on-one.

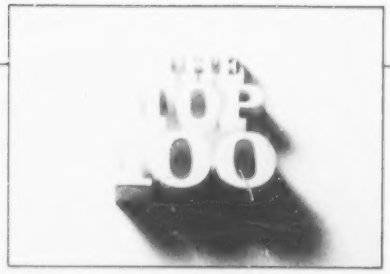
Nonetheless, data processing has traditionally been fertile ground for small companies, and that's unlikely to change in the future. Indeed, signs point to the emergence of a second tier of vendors below the Top 100. Led by independent software houses, the roster of vendors in this tier has begun to grow larger. In the future, consideration of their annual performances and results will be important to understanding the state of the dp industry's health and wealth. □

Gartner Group defines dp revenues as those revenues generated by the sale, lease, or service of dp hardware

Table 12

Top 100 vendors with less than 25 percent of revenues from dp *(Dollars in thousands)*

		Percentage dp in '83	Primary sector	'83 dp revenues	Top 100 rank
1	Exxon	.1%	Word processing	$120,000	87
2	ITT	1.3	OEM peripherals	265,000	46
3	Allied	1.9	Minicomputers	195,000	62
4	Boeing	2.4	Service	275,000	45
5	Signal Companies	3.0	End-user peripherals	180,000	65
6	General Electric	3.0	Service	800,000	18
7	Schlumberger	3.0	CAD/CAM	167,100	70
8	Martin Marietta	3.8	Service	149,400	76
9	3M	4.7	Media	330,050	39
10	Raytheon	5.1	End-user peripherals	302,000	42
11	Continental Telecomm	6.2	Microcomputers	130,000	84
12	McDonnell Douglas	6.5	Service	542,500	25
13	Grumman	7.0	Service	157,000	72
14	Warner Communications	8.2	Microcomputers	281,000	44
15	Northern Telecom	8.3	Minicomputers	220,000	53
16	United Telecommunications	8.8	End-user peripherals	222,000	51
17	Zenith	9.2	Microcomputers	125,000	86
18	Dun & Bradstreet	9.9	Service	150,000	75
19	Motorola	11.9	Data-comm hardware	514,000	27
20	Xerox	14.5	OEM peripherals	1,222,300	10
21	Texas Instruments	16.1	Minicomputers	739,000	20
22	Nashua	17.3	OEM peripherals	97,700	99
23	TRW	18.5	Software	1,015,000	12
24	Perkin-Elmer	20.1	Minicomputers	213,933	54
25	General Instrument	21.5	Service	191,851	64
26	Harris	22.4	End-user peripherals	327,600	41



or software or the provision of a dp service. Revenues are counted for the 12 months ending Dec. 31, 1983. Included are all systems hardware, such as mainframes, minis, micros above the sub-$100 class, word-processing and other office-systems hardware, OEM and end-user peripheral gear, data-communications equipment such as modems and multiplexers, disk and tape media, CAD/CAM systems, software, and maintenance.

Specifically excluded are services related to common-carrier communications, electric and electronic typewriters, electronic cash registers, instrumentation, semiconductors, board-level computers, printed circuit boards, automatic test gear, PABX-type switching equipment, forms, and paper, as well as companies engaged primarily in leasing (to avoid double-counting IBM's revenues), and revenues from retail operations like Computerland.

Gartner Group maintains a database of these statistics that is periodically restated; thus, figures for earlier years reported in 1983's listings may not precisely agree with previously published figures. In particular, comparisons with 1982 figures may differ from previously published data. Gartner Group also restates the revenues of vendors that are not on a December fiscal year; in the event a corporation has an unusual fiscal year (ending in November, for example), the four quarters of data ending closest to December are used. Where companies are closely held or are conglomerates, Gartner Group offers its best estimate of the applicable revenues. Vendors that should be included may be missed.

Gartner Group will publish a detailed compilation of these data in early summer. This book will contain more than 100 cross-section charts and analyses of the structure of the dp industry by company, product, and financial concept. For a brochure on this reference work, circle No. 798 on the Reader-Service Card at the back of the June issue of Computer Decisions *or contact William Cappelli, Gartner Group, 72 Cummings Point Rd., Stamford, CT 06902, (203) 964-0096.*

Index to corporations in the Top 100

Company	Rank	Company	Rank	Company	Rank
Allied	62	General Instrument	64	Printronix	96
Amdahl	19	Gerber Scientific	83		
Apple Computer	11	Gould	38	Quotron	73
Automatic Data Processing	17	Grumman	72		
				Racal-Milgo	32
Boeing	45	Harris	41	Raytheon	42
Burroughs	3	Hewlett-Packard	7	Recognition Equipment	88
		Honeywell	9	Reynolds & Reynolds	79
Centronics Data	67				
Cipher Data Products	100	IBM	1	Sanders	57
C. Itoh	34	Informatics General	60	Schlumberger	70
Commerce Clearing House	91	Interactive Data	93	Seagate	50
Commodore Int'l	13	Intergraph	47	Shared Medical Systems	55
Compaq	90	ITT	46	Signal Companies	65
Computer Consoles	95			Sperry	6
Computer Sciences	21	Lanier Business Products	49	Storage Technology	16
Computervision	31	L.M. Ericsson	89		
Continental Telecomm	84			Tandem Computers	29
Control Data	4	M/A Com	61	Tandon	36
Convergent Technologies	71	Management Assistance	23	Tandy (Radio Shack)	14
CPT	63	Management Science America	80	Tektronix	37
Cray Research	68	Martin Marietta	76	Teletype	30
Cullinet Software	92	McDonnell Douglas	25	Televideo Systems	69
		Mohawk Data Sciences	33	Telex	52
Data General	15	Motorola	27	Texas Instruments	20
Datapoint	24			3M	39
Dataproducts	35	Nashua	99	Triumph-Adler	40
DEC	2	National Data	85	TRW	12
Decision Data	94	National Semiconductor	28	Tymshare	43
Dun & Bradstreet	75	NBI	82		
Dysan	66	NCR	5	United Telecommunications	51
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AUGUST 1984

COMPUTER DECISIONS

THE MANAGEMENT MAGAZINE OF COMPUTING

A HAYDEN PUBLICATION

User-surly software • Environmental control • Guide to printers
Managing networks • Artificial intelligence

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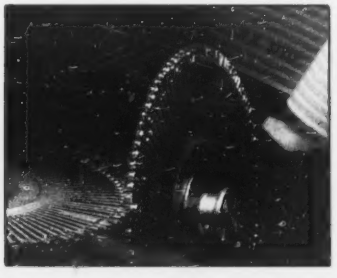

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COVER PHOTO: Ted Hardin

by Randy J. Goldfield and David Culver

OFFICE AUTOMATION

OA for small shops

Office automation is not just for large operations. Small businesses all over the country are making good use of available technology to cut costs and improve the functioning of their offices. Small branches and divisions of giant corporations can learn from these progressive small businesses.

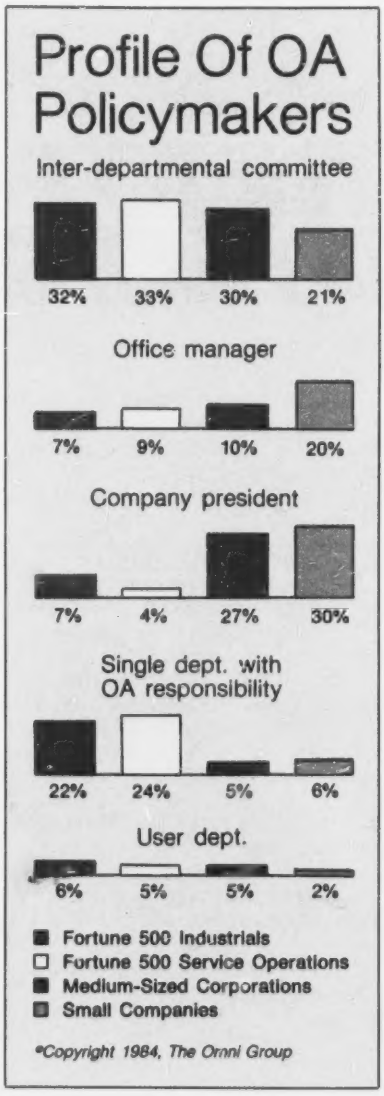
Apples are important to 61-year-old Melvin Brown in two ways. First, his business ships 600,000 cases of them a year. Second, he and his employees depend on six Apple II micros to help them keep shipments moving to market.

Brown is president and general manager of Wells & Wade Fruits Co., an apple grower and distributor. Brown and six employees handle all the company's administrative chores. An additional 60 to 70 employees work in packing, and 12 to 50 seasonal workers make up the rest of Wells & Wade's workforce.

"We used to be hard-pressed to handle the workload here without more clerical help," says Brown. All that's changed now. Three years ago, after taking a computer course at a local community college, Brown decided to install a sophisticated Omninet local area network from Corvus Systems Inc., San Jose, CA. Brown is more than satisfied with his move to microcomputers. "Now all our bills go out the same day the order does," he says.

Wells & Wade does its accounting, invoicing, and payroll on the system, which uses a combination of off-the-shelf software and the Versaform forms-generator program. Everyone in the office has a micro, including Brown, and even the auditor who does the books uses the system. "At first I considered microcomputers as a stopgap solution, just to get us started," Brown says. "Now, with the right software and sufficient memory capacity, we're able to do the job."

Richard Sundin, president of Sundin Associates, a six-employee market-research house in Boston, not only introduced the use of microcomputers in his business, but uses one himself.



Today, Sundin Associates uses three Apple IIes and an Apple II Plus. In four years, the company has doubled its business volume, but hasn't had to increase its staff. Sundin has cut the time spent on accounting and tax preparation from up to 30 hours a month to eight hours. At the same time, he has gained greater control over his business. Sundin's success with his microcomputer is partly due to his engineering background. "I had a leg up on this technology, but there is much more help for small-business people now than when I started," he says. Sundin believes that the small-business executive has to come to grips with the technology. "What happens if the person who runs the micro leaves? Then you're stuck," he says. "Like everything else in a small operation, you have to know how to do it yourself."

In Fairfax, VA, Wolpoff & Abramson, a law firm, saves $7,000 a month in printing costs, thanks to an in-house computerized printing system. Wolpoff & Abramson generates a high volume of documents to support its debt-collection efforts. The preprinted forms required by law cost the firm $10,000 a month until it installed a Xerox 5700 printing system a little more than a year ago. Donald Miller, the firm's one-man data-processing department, oversees the system's operation. Today, when a new form must be presented in court, he gets a sample form from the court, goes through a font catalog, and, in a few minutes, designs the new form on the electronic printer. In an average day, he will print out 4,500 sheets on the Xerox 5700, which is linked to the firm's Burroughs mainframe. "Our forms include names and addresses that are automatically pulled from the computer's database. Circuit-court judges will not accept computer printouts," Miller says. "Before this system was installed, we sometimes had to

throw out a year's supply of forms simply because a court decided to change a form without giving us advance notice," he adds.

Miller has programmed the printer to work automatically. Aside from setting up a new form now and then (the firm uses 65 forms for six court systems), all he has to do is load paper stock and empty the output hopper.

Wolpoff & Abramson also sends out almost 600 computer-generated letters a day, an increase of 50 percent over last year. They are highly legible and may include signatures and logos from any of the various jurisdictions of district, small claims, and circuit courts the firm serves in Maryland, Virginia, and Washington.

A small revolution

The information revolution has spawned a new group of systems developers: entrepreneurs and small-business owners who, with only an understanding of their business requirements, are successfully establishing OA systems by trial and error. "It wasn't easy getting it right, but we managed to," says Melvin Brown of his experimental approach. "I'm quite proud of learning the hard way and doing so well," says Richard Sundin.

Clearly, small businesses are no longer limiting their OA systems to an electronic typewriter or a dedicated word processor. More frequently, they are taking a high-tech approach to lightening their administrative burdens. And they do it without large, dedicated MIS staffs or costly consultants.

In a recent Omni Group study, small businesses reported that while office automation committees and office managers take part in forming company policy on office automation, most frequently the president is the final decision-maker (30 percent of the time). This is in contrast to the practice in large corporations, where committees set policy approximately 32 percent of the time, and a single department (usually MIS) is responsible about 22 percent of the time (see chart).

Despite their inexperience, these small businesses make installing OA look easy. Perhaps this is due to their willingness to experiment and make firm decisions. Managers of smaller divisions of large corporations can learn from their experience. □

Randy J. Goldfield, founder and president of the Omni Group, an OA consultancy based in New York, is a frequent contributor to this column. Her co-author, David Culver, is a senior consultant with the firm.

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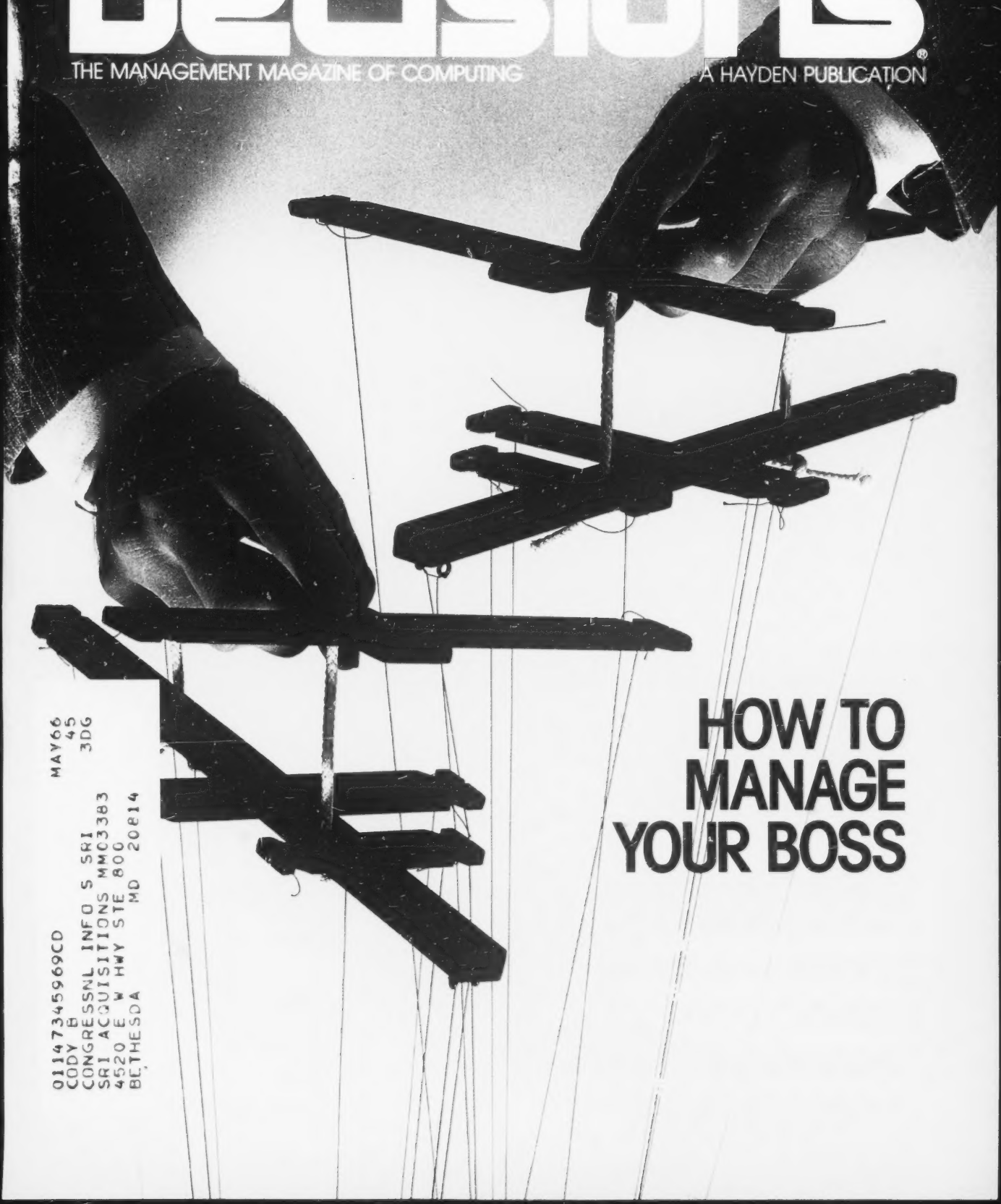

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HOW TO MANAGE YOUR BOSS

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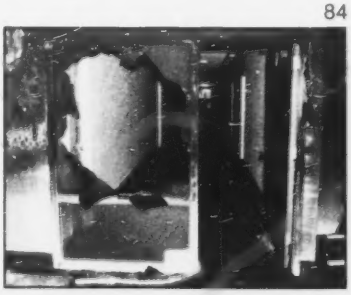

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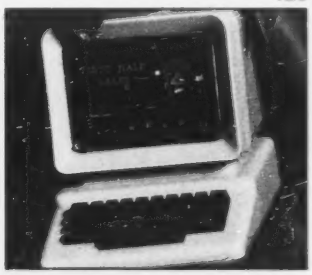

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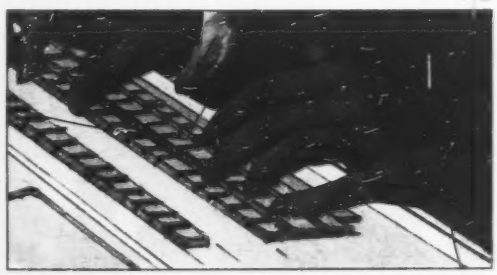

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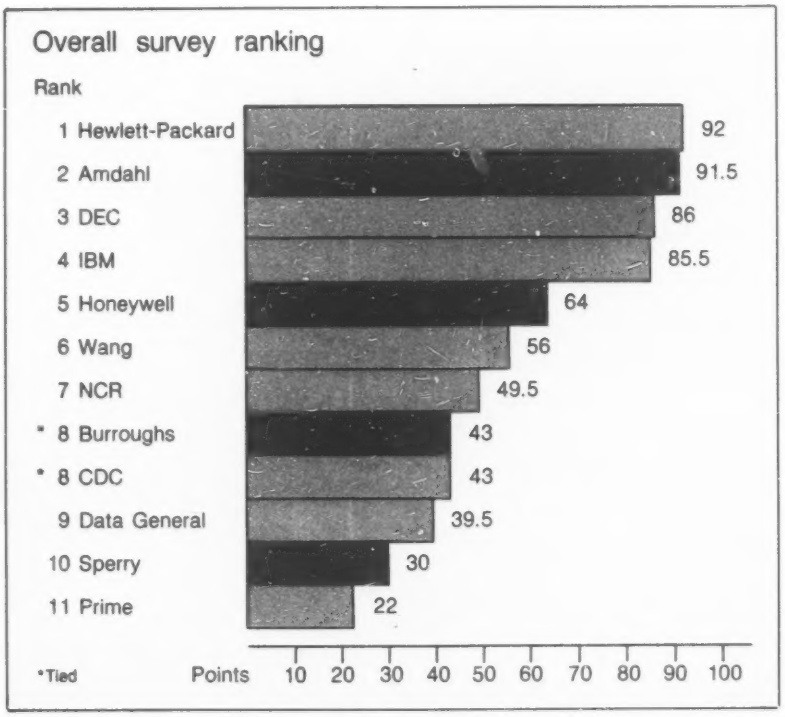
Semi-tough leaders
COVER PHOTO: Ted Hardin

Users rate HP number one

Look who's number one. Hewlett-Packard was rated the best of 12 large-systems manufacturers in a recent survey of about 2,800 users in industry and government. Amdahl ranked a close second. Digital Equipment Corp. (DEC) came in third, and IBM placed fourth. Bringing up the rear among the majors were Data General, Sperry, and Prime.



The survey, by Stuart Kirkland, a Bellevue, WA, market-research house, evaluated user attitudes toward 12 large-system vendors. The overall ranking was based on the quality of each manufacturer's hardware, software, and service. Users were asked to assess the manufacturers on a scale of "very satisfied" to "very dissatisfied" in each category. Hardware was rated for reliability and ease of use. Service was rated for response time, parts availability, and effectiveness of repair. Software was evaluated in seven categories: systems, applications, utilities, ease of use, documentation, service, and quality. Each manufacturer received a general "good-will" rating as a vendor to do business with.

A summary of the survey's findings on each of the 12 manufacturers follows:

Hewlett-Packard Co. (Palo Alto, CA) ranked number one in service. HP excelled in parts availability and ranked first in software service and support. It was consistently rated near the top in reliability and hardware ease of use, service response time, effectiveness of repair, systems software, documentation, and as a manufacturer to do business with. "Users of Hewlett-Packard's products are impressed with their reliability," according to the study. "However, they complain that its service could be faster and its products less expensive."

Users had only good things to say about **Amdahl Corp.** (Sunnyvale, CA). The company was rated as the manufacturer with the best hardware and as the best company to do business with. "Amdahl's hardware is considered to be very reliable and is the easiest to use. Its service is very good in all respects, and it ranked first in speed of service response."

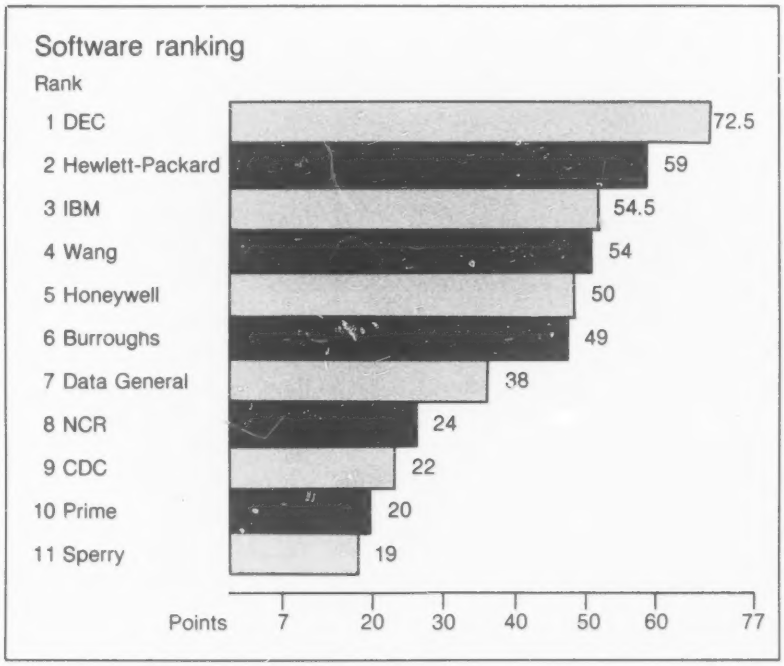
Digital Equipment Corp. of Maynard, MA, consistently received high scores in every category. DEC's strongest point is its software: It ranked first in systems software, applications programs, documentation, and overall software quality. It ranked fourth in the hardware and service categories.

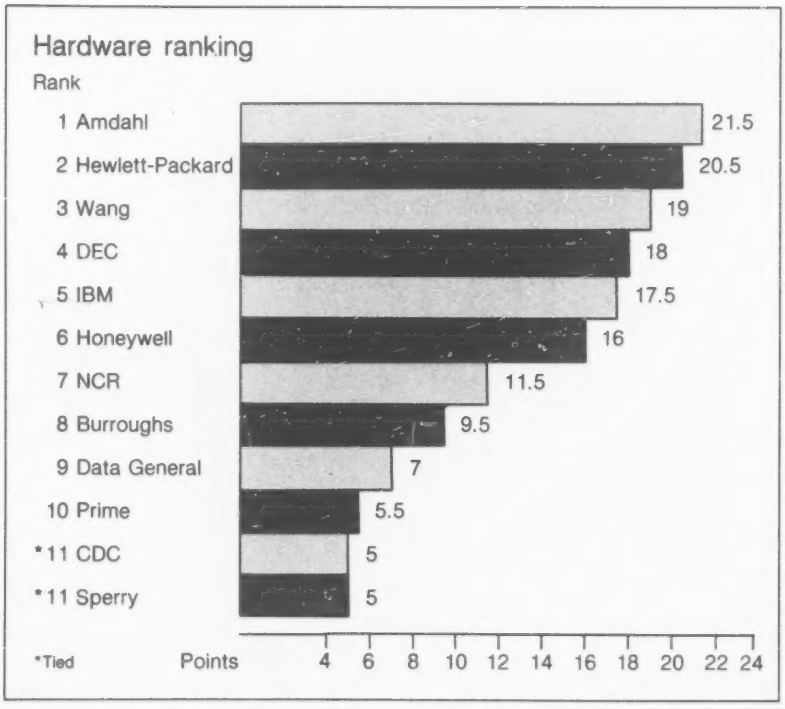
IBM (Armonk, NY) ranked fifth in the overall hardware ranking. However, IBM scored first in hardware reliability, and its service ranked second after HP. It also ranked first in effectiveness of repair. Moreover, unlike the other manufacturers, IBM's performance in these categories did not vary in different parts of the nation. Although it was third in overall software quality, it scored in the middle ranges for systems software, utilities, applications programs, and ease of use.

The survey revealed a significant drop in satisfaction between the top four manufacturers and the other eight. **Honeywell Information Systems Inc.** (Waltham, MA) consistently ranked in the middle ranges in hardware, software, and service. It received above-average marks for ease of software use and below-average marks in parts availability and software quality. *(News continued on page 18)*

(Continued from page 16)

There was good and bad news for **Wang Laboratories Inc.** (Lowell, MA). Wang was rated number one in software ease of use and tied for third in both hardware reliability and hardware ease of use. However, it ranked 10th in service and eighth as a company to do business with.





Most of the ratings for **NCR Corp.** (Dayton, OH) were average, but it was rated below average in parts availability and received below-average marks in five software areas: systems, utilities, applications, service, and software quality.

Burroughs Corp. (Detroit, MI) ranked last in service. Its hardware was rated as adequate. Burroughs' software received good marks in the systems, utilities, and ease-of-use categories, but fared poorly in documentation and service.

Control Data Corp. (Minneapolis, MN) was rated below average in seven of 13 categories and average for the rest. Control Data's below-average rating in hardware ease of use tied it for last in the overall hardware rating. Its software utilities and documentation are weak, according to respondents, and it came in ninth in the overall software rating. CDC's strongest showing was in hardware service.

Data General Corp. (Westboro, MA) scored last as a vendor to do business with. Respondents consider its hardware adequate but hard to use, and its service inconsistent. Its strongest overall showing was in the software category, where it ranked seventh. "The strongest point for Data General is its applications software, the only category where it scores above average. Most of the other manufacturers perform poorly in this category," according to the survey.

Sperry Corp. (Blue Bell, PA) rated average or below average in all categories. Its hardware scored the lowest in reliability of all 12 manufacturers. Its service was rated ninth, and it ranked in the bottom third of the 12 manufacturers as a company to do business with.

Prime Computer Inc. (Natick, MA) also didn't achieve a single above-average rating. It was rated 11th in service and as a vendor to do business with. Its software ranked below average in all categories except ease of use, in which it earned an average rating. *(News continued on page 20)*